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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,010	10/13/2000	Jerome R. Bellegarda	04860.P2564	9170

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EXAMINER

WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
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2655

DATE MAILED: 08/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/688,010

Applicant(s)

BELLEGARDA, JEROME R.

Examiner

James S. Wozniak

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-21 and 24-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-14,16-21 and 24-38 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/13/2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. In response to the office action from 3/10/2005, the applicant has submitted an amendment, filed 6/10/2005, arguing to traverse the art rejection based on the limitation regarding classifying a sequence of words based on a vector representation in a semantic space (*Amendment, Pages 2-4*). Applicant's arguments have been fully considered, however the previous rejection is maintained due to the reasons listed below in the response to arguments.

Response to Arguments

2. Applicant's arguments have been fully considered but they are not persuasive for the following reasons:

With respect to **Claims 1, 20, and 35**, the applicant argues that the prior art of record fails to teach classifying a sequence of words based on a vector representation in a semantic space (*Amendment, Pages 2-4*), however the examiner notes that the combination of Gorin et al (U.S. Patent: 5,860,063), Schuetze (U.S. Patent: 5,675,819), and Bangalore et al (U.S. Patent: 6,317,707) teaches such a classification.

Gorin teaches the steps of recognizing a sequence of words as a voice command (*Col. 2, Lines 54-66*) and clustering semantically related phrases utilizing word agglomeration (*Col. 7, Lines 38-39*). Although Gorin teaches word agglomeration, Gorin does not teach a method of

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word agglomeration intended by the present invention, however Schuetze teaches the same type of word agglomeration as the present invention utilizing the replacement of an input sequence of words with an associated sequence of word pair strings for the benefit of word pre-processing for efficient clustering (*Col. 15, Lines 13-41; and Previous office action, Page 5*). Thus, the combination of Gorin and Schuetze yields a means for recognizing a command word sequence and semantically clustering words utilizing word agglomeration that replaces a sequence of words with an associated n-tuple sequence comprising all strings of n consecutive words in the word sequence.

Gorin in view of Schuetze does not teach representing a word as a vector representation, however Bangalore provides such a representation. Bangalore teaches a process of classifying words represented by vectors for the benefit providing a convenient means for representing speech features to judge similarity (*Col. 1, Line 59- Col. 2, Line 6; and Prior office action, Page 6*). The applicant has argued that Bangalore merely recites syntactic clustering, however while the method utilized by Bangalore teaches grammatical significance as noted by the applicant (Amendment, Page 3), lexical significance is also provided by Bangalore and does not refer to syntax as is noted in Col. 1, Lines 30-33. Lexical significance is related to the meaning of a word and can be seen in the system results of Table 2. Furthermore, the examiner notes that the teachings of Bangalore are relied upon only for vector representation in word classification for a sequence of terms that has already been semantically processed as per the teachings of Gorin. Thus, the vector space taught by Bangalore merely provides a means of representing semantically processed words for judging similarity (*Col. 1, Line 59- Col. 2, Line 6*), and when

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taken in combination with the teachings of Gorin and Schuetze, teaches the aforementioned claim limitation.

The dependent claims are argued as further limiting a rejected independent claim (*Amendment, Pages 4-5*), and thus, also remain rejected.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. **Claims 1, 2, 5-21, and 24-38** are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **Claims 1-24** of U.S. Patent No. 6,208,971 in view of Gorin et al (*U.S. Patent: 5,860,063*). The addition of a word agglomeration unit to U.S. Patent No. 6,208,971, would have been obvious to one of ordinary skill in the art at the time of invention since the well-known clustering technique of word agglomeration (*clustering meaningful phrases using an agglomerative clustering procedure, Col. 7, Lines 38-39*) is a more specific embodiment of the well-known clustering method referred to in Bellegarda et al (*word sequence classification implemented using clustering algorithms well known to those skilled in the art, Col. 6, Lines 11-17*). Also, the additional limitations pertaining to semantic anchors from training data, calculation of a distance to determine correlation, and word sequence order would all have been obvious to one of ordinary skill in the art, at the time of invention since, respectively, training allows for the well-known technique of detecting speech from a specific speaker, distance calculation is a well-known means of correlation determination in clustering (*Col. 7, Lines 38-39*), and semantic relations would be dependent upon word order, since semantics regards meaning within language, and words must be properly arranged in order to convey meaning in the form of a complete thought or command.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 1-2, 5-6, 12, 20-21, 24, 31, and 35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorin et al (*U.S. Patent: 5,860,063*) in view of Schuetze (*U.S. Patent: 5,675,819*), and further in view of Bangalore et al (*U.S. Patent: 6,317,707*).

With respect to **Claims 1, 20, 31, and 35**, Gorin discloses:

A method and machine readable medium containing instructions for recognizing speech (*Col. 2, Lines 54-66*), the method comprising:

Recognizing a sequence of words received as a voice command (*meaningful phrase processed by speech recognizer to perform a related task, Col. 2, Lines 25-29*).

Processing the sequence of words using word agglomeration (*clustering meaningful phrases using an agglomerative clustering procedure, Col. 7, Lines 38-39*).

Classifying the processed sequence of words as a predetermined command (*classifying clustered phrases related to a command, Col. 7, Line 66- Col. 8, Line 4 and word sequence vectors, Figs. 6 and 7*).

Gorin does not specifically suggest that agglomerative clustering involves replacing a sequence of words with an associated n-tuple sequence, wherein the n-tuple sequence comprises all strings of n consecutive words in the sequence of words, however Schuetze discloses such a feature in word agglomeration (*Col. 15, Lines 13-18*).

Gorin and Schuetze are analogous art because they are from a similar field of endeavor in word clustering and classification. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Gorin with the word

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agglomeration method taught by Schuetze to provide word pre-processing for efficient clustering (*Schuetze, Col. 15, Lines 13-41*).

Gorin does not teach that the classification of a word sequence is based upon a vector representation of the processed sequence of words in a semantic space, however, Bangalore recites:

Classification of a word sequence is based upon a vector representation of the processed sequence of words in a semantic space (*vector representation of a word or phrase used for clustering based upon lexical significance that is determined by a distance measure, Col. 1, Line 59- Col. 2, Line 15*).

Gorin, Schuetze, and Bangalore are analogous art because they are from a similar field of endeavor in word clustering and classification. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to combine the means of clustering a word sequence according to a vector representation and based on lexical significance as taught by Bangalore with the command clustering means through an agglomerative method as taught by Gorin in view of Schuetze to provide a well known means of representing speech features for similarity distance calculations in command clustering.

With respect to **Claims 2 and 21**, Gorin further recites:

Performing an action corresponding to the predetermined command (*speech input command related to a number of executable actions, Col. 4, Lines 21-45*).

With respect to **Claims 5 and 24**, Gorin adds:

Classifying comprising: semantically inferring the predetermined command from the associated word n-tuple sequence (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*).

With respect to **Claim 6**, Gorin further discloses:

Classifying comprises semantically inferring the predetermined command from the sequence of words (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*).

With respect to **Claim 12**, Gorin suggests:

Semantically inferring the predetermined command depends on the order of the words in the processed sequence of words (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*). One of ordinary skill in the art, at the time of invention, would have known that a semantic relation is dependent upon word order, since semantics regards meaning within a given language, and the words must be arranged in certain order to convey nuances of meaning.

7. **Claims 7-11, 13-14, 16-19, 25-30, 32-34, and 36-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorin et al in view of Schuetze in view of Bangalore et al, and yet further in view of Karaorman et al (*U.S. Patent: 6,631,346*).

With respect to **Claims 7 and 25**, Gorin in view of Schuetze in further view of Bangalore teaches the method of determining a command by phrase clustering through semantic relations as applied to Claim 6. Gorin in view of Schuetze in further view of Bangalore does not specifically suggest the use of a semantic anchor as a means of identifying the semantic relations between a

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command phrase and a sequence of words. The examiner has interpreted “semantic anchor” to mean an accompanying word or phrase that helps identify the specific meaning of a word or phrase (in the present example, a command word or phrase). Thus, it would have been obvious to one of ordinary skill in the art, at the time of invention, from the definition of “semantic anchor” as interpreted by the examiner, that the phrase clustering utilizing semantic relations as taught by Gorin would include a semantic anchor as a means of identifying the semantic relations between a command phrase and a sequence of words to differentiate similar phrases as used in various contexts (*as evidenced by Karaorman- assigning a classifying tag indicative of speech input content that utilizes context information Col. 6, Lines 19-65, which is a functional equivalent of a semantic anchor*). Gorin, Schuetze, Bangalore, and Karaorman are analogous art because they are from a similar field of endeavor in word clustering and thus, obvious in combination as a means of identifying the semantic relations between a command phrase and a sequence of words to differentiate similar phrases as used in various contexts.

With respect to **Claims 8 and 26**, Bangalore additionally discloses:

The correlation is a distance between a vector corresponding to the processed sequence of words and a vector corresponding to the at least one semantic anchor (*distance measure between an input speech vector and a context word vector, which is a functional equivalent of a semantic anchor vector, in order to cluster words or phrases based upon lexical significance, Col. 1, Line 59- Col. 2, Line 15*).

With respect to **Claims 9 and 27**, Gorin in view of Schuetze in further view of Bangalore teaches the method of determining a command by phrase clustering through a vector distance calculation as applied to Claim 8. Also, it would have been obvious to one of ordinary skill in

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the art, at the time of invention, to select a command having the shortest distance from a semantic anchor since a minimal distance would be directly related to a greater amount of correlation and thus, a higher likelihood that a particular voice command corresponds to a semantic anchor for successful command recognition (*as evidenced by Bangalore- distance calculation related to a shortest distance selection, Col. 3, Line 65- Col. 4, Line 3*).

With respect to **Claims 10 and 28**, Gorin further discloses:

The semantic anchor represents a one of a plurality of predetermined commands (*example of words relating to billing and credit card payment commands, providing semantic information to differentiate similar terms within different contexts, Col. 7, Lines 42-49*).

With respect to **Claims 11 and 29**, Gorin discloses:

The at least one semantic anchor is derived from a training data (*training of a phrase associated with a command, Col. 7, Lines 10-15, to be used in clustering through semantic relations as applied to Claim 6*).

Claims 13, 33, and 37 recite subject matter similar to Claim 8, and thus are rejected for similar reasons.

Claims 14, 34, and 38 recite subject matter similar to Claim 9, and thus are rejected for similar reasons.

With respect to **Claim 16**, Gorin further discloses:

The vector representation is an indication of how frequently each of a plurality of word n-tuples occurs within the processed sequence of words (*phrase vectors containing information relating to the phrase occurrence amount, Col. 7, Lines 10-15*).

With respect to **Claim 17**, Gorin recites:

The vector representation is an indication of how frequently each of a plurality of word n-tuples occurs with respect to the corresponding command (*phrase vectors containing information relating to the number of occurrences within various command classes, Col. 7, Lines 10-15*).

With respect to **Claim 18**, Gorin discloses:

Each of the plurality of semantic anchors represents a plurality of different ways of speaking the corresponding command (*Fig. 6, and Col. 7 Line 66-Col. 8, Line 4*).

With respect to **Claim 19**, Gorin in view of Bangalore recites the method of clustering similar commands spoken in different manners as applied to Claim 18. Also, it would have been obvious to one of ordinary skill in the art, at the time of invention, that similar phrase clustering as taught by Gorin would also include the clustering of similar commands with variations in word order since those alternate phrases would still be referring to the same command (*as evidenced by Bangalore- the speech clustering method as applied to Claim 8, in which the grammatical content of a word or phrase is analyzed Col. 1, Line 59- Col. 2, Line 15. Therefore word order would not be important since only the grammatical content of a phrase would be analyzed for clustering*).

With respect to **Claim 30**, Gorin suggests:

Semantically inferring the predetermined command depends on the order of the words in the processed sequence of words (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*). One of ordinary skill in the art, at the time of invention, would have known that a semantic relation is dependent upon word order, since semantics regards meaning within a given language, and the words must be arranged in certain order to convey nuances of meaning.

With respect to **Claims 32 and 36**, Gorin in view of Bangalore discloses:

An action generator, coupled to the semantic classifier, to use the vector representation to determine an action to be performed (*classification processor, Fig. 4, Element 30, task objectives, Fig. 4, and speech vectors as taught by Bangalore and applied to Claim 1*).

Allowable Subject Matter

8. **Claim 15** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

With respect to **Claim 15**, the prior art of record fails to explicitly teach or fairly suggest and is not obvious in combination with regards to a process for identifying the similarity between a vector representation of a processed sequence of speech command words and a semantic anchor to classify a speech command according to a semantic anchor by calculating the cosine of the angle between the product of the vector representation and a diagonal matrix of singular values and the product of the semantic anchor and the diagonal matrix of singular values and classifying the speech command according to a semantic anchor with a largest cosine value (most similar). The prior art of record fails to explicitly teach or fairly suggest the aforementioned similarity calculation for use in a method for processing speech commands utilizing word agglomeration that replaces a sequence of words with an n-tuple sequence.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Bellegarda et al (*U.S. Patent: 5,828,999*)- teaches semantic vector clustering.

Arai et al (*U.S. Patent: 6,173,261*)- teaches syntactic and semantic clustering utilizing vector representations.

Bradford (*U.S. Patent Publication: 2002/0026456*)- teaches term clustering in a semantic vector space.

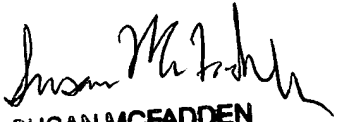
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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632 and email is James.Wozniak@uspto.gov. The examiner can normally be reached on Mondays-Fridays, 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached at (571) 272-7582. The fax/phone number for the Technology Center 2600 where this application is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology center receptionist whose telephone number is (703) 306-0377.

James S. Wozniak
7/21/2005


SUSAN MCFADDEN
PRIMARY EXAMINER